

LMX/wherein

- (a) M is a Group 9, 10 or 11 metal;
- (b) L is a bidentate ligand defined by the formula:



- (i) A is a bridging group containing a Group 13-15 element;
- (ii) each E is independently a Group 15 or 16 element covalently bonded to M;
- (iii) each R is independently a C<sub>1</sub>-C<sub>30</sub> radical or diradical group which is a hydrocarbyl, substituted hydrocarbyl, halocarbyl, substituted halocarbyl, hydrocarbyl-substituted organometalloid, or halocarbyl-substituted organometalloid,
- (iv) m and n are independently 1 or 2 depending on the valency of E; and
- (v) p is the charge on the bidentate ligand such that the overall charge of LMXr is neutral;
- (c) each X is, independently, a hydride radical, a hydrocarbyl radical, a substituted hydrocarbyl radical, a halocarbyl radical, a substituted halocarbyl radical, hydrocarbyl-substituted organometalloid or halocarbyl-substituted organometalloid; a univalent anionic ligand; a neutral hydrocarbyl-containing donor ligand; a neutral non-hydrocarbyl atom containing donor ligand; or two Xs are joined and bound to the metal atom to form a

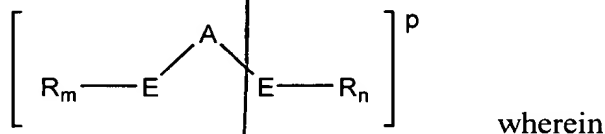
metallacycle ring containing from 2 to 20 carbon atoms; or two Xs are joined to form an anionic chelating ligand; and

(d) r is 1, 2 or 3.

6. (Amended four times) A late transition metal catalyst precursor for olefin polymerization comprising a Group -9, -10 or -11 metal connected to a bidentate ligand immobilized on a solid support, wherein the catalyst precursor has the formula:

$LMX_r$ , wherein

- (a) M is a Group 9, 10 or 11 metal;
- (b) L is a bidentate ligand defined by the formula:



- (i) A is a bridging group containing a Group 13-15 element;
- (ii) each E is independently a Group 15 or 16 element covalently bonded to M;
- (iii) each R is independently a  $C_1$ - $C_{30}$  radical or diradical group which is a hydrocarbyl, substituted hydrocarbyl, halocarbyl, substituted halocarbyl, hydrocarbyl-substituted organometalloid, or halocarbyl-substituted organometalloid,
- (iv) m and n are independently 1 or 2 depending on the valency of E; and

(v) p is the charge on the bidentate ligand such that the overall charge of  $LMX_r$  is neutral;

(c) each X is, independently, a hydride radical, a hydrocarbyl radical, a substituted hydrocarbyl radical, a halocarbyl radical, a substituted halocarbyl radical, hydrocarbyl-substituted organometalloid or halocarbyl-substituted organometalloid; a univalent anionic ligand; a neutral hydrocarbyl-containing donor ligand; a neutral non-hydrocarbyl atom containing donor ligand; or two Xs are joined and bound to the metal atom to form a metallacycle ring containing from 2 to 20 carbon atoms; or two Xs are joined to form an anionic chelating ligand; and

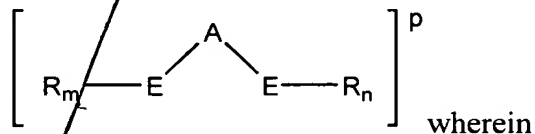
(d) r is 1, 2 or 3.

13. (Amended four times) A late transition metal catalyst precursor, essentially without residual solvent, for olefin polymerization comprising a Group -9, -10 or -11 metal connected to a bidentate ligand immobilized on a solid support, wherein the catalyst precursor has the formula:

$LMX_r$  wherein

(a) M is a Group 9, 10 or 11 metal;

(b) L is a bidentate ligand defined by the formula:



(i) A is a bridging group containing a Group 13-15 element;

(ii) each E is independently a Group 15 or 16 element covalently bonded to M;

(iii) each R is independently a C<sub>1</sub>-C<sub>30</sub> radical or diradical group which is a hydrocarbyl, substituted hydrocarbyl, halocarbyl, substituted halocarbyl, hydrocarbyl-substituted organometalloid, or halocarbyl-substituted organometalloid,

(iv) m and n are independently 1 or 2 depending on the valency of E; and

(v) p is the charge on the bidentate ligand such that the overall charge of LMXr is neutral;

(c) each X is, independently, a hydride radical, a hydrocarbyl radical, a substituted hydrocarbyl radical, a halocarbyl radical, a substituted halocarbyl radical, hydrocarbyl-substituted organometalloid or halocarbyl-substituted organometalloid; a neutral hydrocarbyl-containing donor ligand; a univalent anionic ligand; a neutral non-hydrocarbyl atom containing donor ligand; or two Xs are joined and bound to the metal atom to form a metallacycle ring containing from 2 to 20 carbon atoms; or two Xs are joined to form an anionic chelating ligand; and

(d) r is 1, 2 or 3.

17. (Amended three times) A catalyst system wherein the catalyst precursor of Claim 1, 6, or 13 has been treated with a noncoordinating anion precursor to form a catalyst comprising a metal cation and a noncoordinating anion.

18. The catalyst system of Claim 17 wherein the noncoordinating anion is tetrakis(perfluorophenyl)boron

65 19. (Amended Three Times) The catalyst system of Claim 17 wherein the noncoordinating anion precursor is a halide salt of Group-13-16 metals or metalloids.

20. (Twice Amended) The catalyst system of Claim 19 wherein the catalyst-precursor-to-noncoordinating-anion-precursor molar ratio is from 10:1 to 1:10.

66 22. (Amended Once) A polymerization process for polymerizing olefinically unsaturated monomers comprising contacting one or more of ethylene, C<sub>3</sub>-C<sub>20</sub> olefin, C<sub>4</sub>-C<sub>20</sub> cyclic olefin, C<sub>4</sub>-C<sub>20</sub> non-conjugated diolefin, C<sub>8</sub>-C<sub>20</sub> aromatic substituted olefin, C<sub>4</sub>-C<sub>20</sub> gem-substituted olefins, or C<sub>20</sub>-C<sub>1000</sub> olefin macromer with a catalyst system of Claim 17.

23. (Amended Once) The polymerization process of Claim 22 comprising conducting the contacting step under gas phase polymerization conditions.

24. (Amended Once) The polymerization process of Claim 23 wherein the reactor temperature is from -100 °C to 150 °C and at a pressure up to 7000 kPa.

25. The polymerization process of Claim 24 additionally comprising a scavenging compound.

67 26. (Amended Once) The polymerization process of Claim 22 comprising conducting the contacting step under slurry polymerization conditions.

27. The polymerization process of Claim 26 wherein the reactor temperature is from 0 °C to 150 °C and at a pressure from 0.76 MPa to 4.8 MPa

30. (Amended Twice) The catalyst system of Claim 17 wherein LMX<sub>r</sub> has a square planar geometry.